WB2HOL Complete Tape Measure 3-Element Beam Kit

http://home.att.net/~jleggio/projects/rdf/rdf.htm

(sold with permission of Joe Leggio, WB2HOL)
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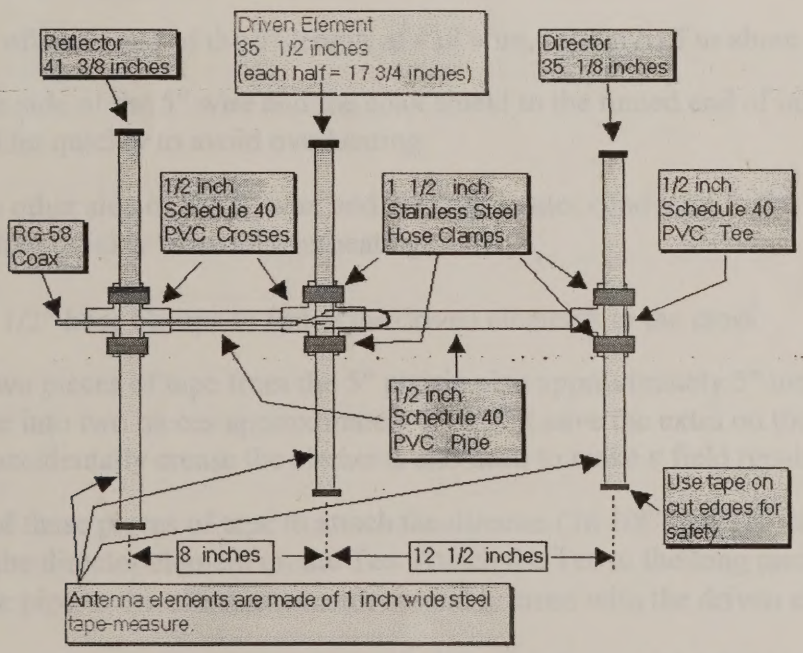
Parts List

Qty	Description
1	1/2" PVC Schedule 40 Tee
1	11.5" piece of 1/2" PVC Schedule 40 Pipe
1	5" piece of 1/2" PVC Schedule 40 Pipe for handle with about 18" of gaffers tape
1	Assembly w/offset attenuator, enclosure, BNC connector, switch, crosses, and a choke balun
1	1" Tape Measure x 41 3/8" (Reflector) CAUTION - EDGES ARE SHARP
2	1" Tape Measure x 17 3/4" (Driven Elements) CAUTION - EDGES ARE SHARP
1	1" Tape Measure x 35 1/8" (Director) CAUTION - EDGES ARE SHARP
2	1" hose clamps
5"	#20 or so wire (Hairpin Match)
8"	Gaffers Tape (Wrapped around tape measure elements)



Note 1: The diagram shows a straight 7" pipe instead of the offset attenuator assembly.
Note 2: This kit uses two hose clamps to hold the driven elements in place, and Gaffers Tape for the other elements
Note 3: 6 turns of RG-174 wound around boom in front of offset attenuator housing not shown in above drawing.
Note 4: Longest element at back, 2 short elements in middle, and next shortest at front.

soldering station w/ large tip + stel tip
2x flux
solder
tape
marker
tool pouch
meter
BNC cable
TNC adaptor
power strip
pencils
1N4148
solderwick

r-j bro 5C Battnct

checkoff steps 3, 5, 6, 7 + 8.

Assembly instructions for the Complete Tape Measure Beam kit.

Note: The complete tape measure beam kit includes the completed offset attenuator and enclosure with attached crosses and coax instead of the 7" middle beam piece as shown in the diagram.

#1

- ❑ Remove the tape from the elements being careful to keep the tape from sticking to itself.

Caution: Be careful when removing the tape from the tape measure elements as the elements can spring out.

while waiting do #2, 10 and 11 mark center of elements

- ❑ Tear the 2" tape into six pieces approximately 2" x 1 ¼". Attach these pieces to the ends of both the reflector and director and the **rounded** end of the two short driven elements. This helps protect others from the ends of the elements.
- ☑ Scrape a ¼" circle of paint off the **square** end of the two short driven elements and tin the area with solder.

First part of #4 then bring solid hookup wire

- ❑ Strip about 1" of insulation from the end of the RG-174 or RG-58 Coax and carefully separate the shield from the center conductor. You will now have a 1" section of shield and a 1" section of center conductor. Strip about 1/4" of insulation from the center conductor.
- ☑ Tin the ends of both the center conductor and the shield being careful not to overheat either.

Caution: Overheating can melt the center conductor insulation and cause a short in the cable where the shield and center conductor meet.

- ☑ Strip 1/4" off each end of the 5" length of #18 wire, fold in half to about 3/4" spacing.
- ❑ Solder one side of the 5" wire and the coax shield to the tinned end of one of the driven elements. Again, solder quickly to avoid overheating.
- ❑ Solder the other side of the 5" wire and the coax center conductor to the other driven element. Again, solder quickly to avoid overheating.
- ❑ Use the 1 1/2" hose clamps to fasten the driven elements to the cross.

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- ❑ Tear off two pieces of tape from the 5" plastic pipe approximately 5" long. Tear each piece lengthwise into two pieces approximately 1" x 5". Leave the extra on the handle for "splints" in case you accidentally crease the elements and need to make a field repair.

11

- ❑ Use two of these pieces of tape to attach the director (36 1/8" long) to the plastic Tee taking care to center the director element on the Tee. Attach the Tee to the long piece of plastic pipe and attaché the pipe to the offset attenuator assembly cross with the driven elements already attached.
- ❑ Use the remaining two pieces of tape to attach the reflector (41 3/8") to the plastic cross nearest the BNC connector again taking care to center it.
- ❑ Put the 5" piece of pipe with the remaining gaffers tape into bottom of the cross.

Congratulations, your Tape Measure Beam is now complete!

Mary paper to cover 1 table

Using the K0OV Offset Attenuator

To use the offset attenuator, connect the output of the offset attenuator to your receiver antenna input. After turning the unit on, tune the receiver to the offset frequency (original frequency +/- the offset frequency).

Maximum attenuation is when the knob is turned fully CCW (counter clock-wise,) and minimum attenuation is when the knob is turned fully CW (clock-wise.)

Example:
Transmit frequency – 146.565 MHz
Offset frequency – 4 MHz

Output Frequencies
Transmitted Frequency - 146.565 MHz
Minus Offset Frequency - 142.565 (146.565 – 4.000 MHz offset frequency)
Plus Offset Frequency - 150.565 (146.565 + 4.000 MHz offset frequency)

Suggestion – Turn your receiver squelch all the way off so you can hear weak signals.

Warning – if you accidentally transmit through the offset attenuator, you might destroy the mixing diode. If that happens, the mixing diode is a very standard part that is easily replaced.

Notes:

For transmitter hunting, apply enough attenuation to keep the signal in the noise. More attenuation will be needed as you get closer to the transmitter.

Stronger signals result in less noise.

While either plus or minus offsets will work, one could work better than the other depending on external signals. So try both to see which works best.

Sometimes, you will get close to a transmitter and find you need more than the maximum offset attenuation (especially on stronger transmitted signals.)

An easy solution is to disconnect the cable to your receiver and replace the receiver antenna. By increasing the distance between the receiver antenna and the offset attenuator output cable, you will be able to get more attenuation. You may have to experiment with the relationship of the antenna to the cable end for best results.

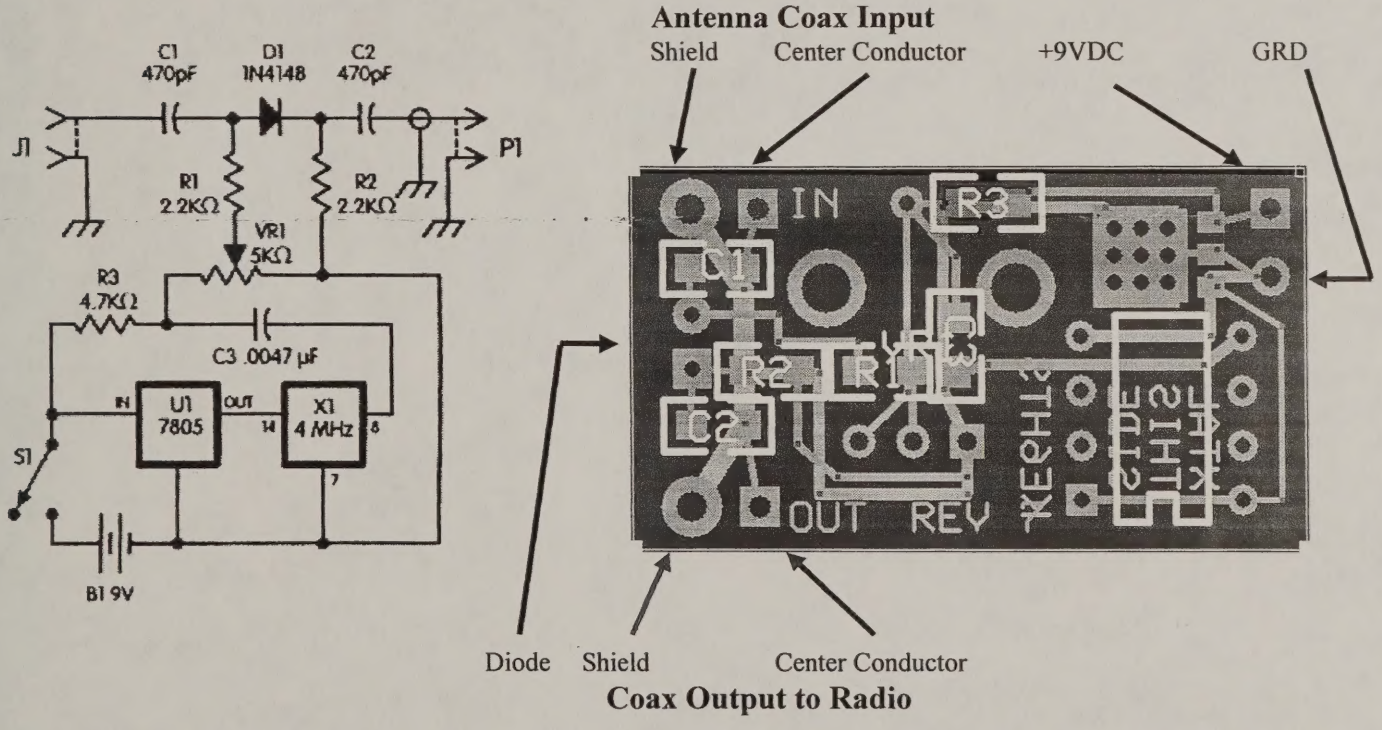
Finally, if you want others who are nearby to hear on their receivers what is happening for training purposes, replace the cable with a rubber ducky antenna. They can then tune to the offset frequency to follow what is happening. This works because the output from the offset attenuation is actually a very low level RF signal. Adding an antenna will give a range of around 20 feet or so.

Radio Direction Finding Offset Attenuator - Rev 7

Designed by Joe Moell, K0OV, http://www.homingin.com
Made by Marvin Johnston, KE6HTS, marvin@west.net, http://www.west.net/~marvin

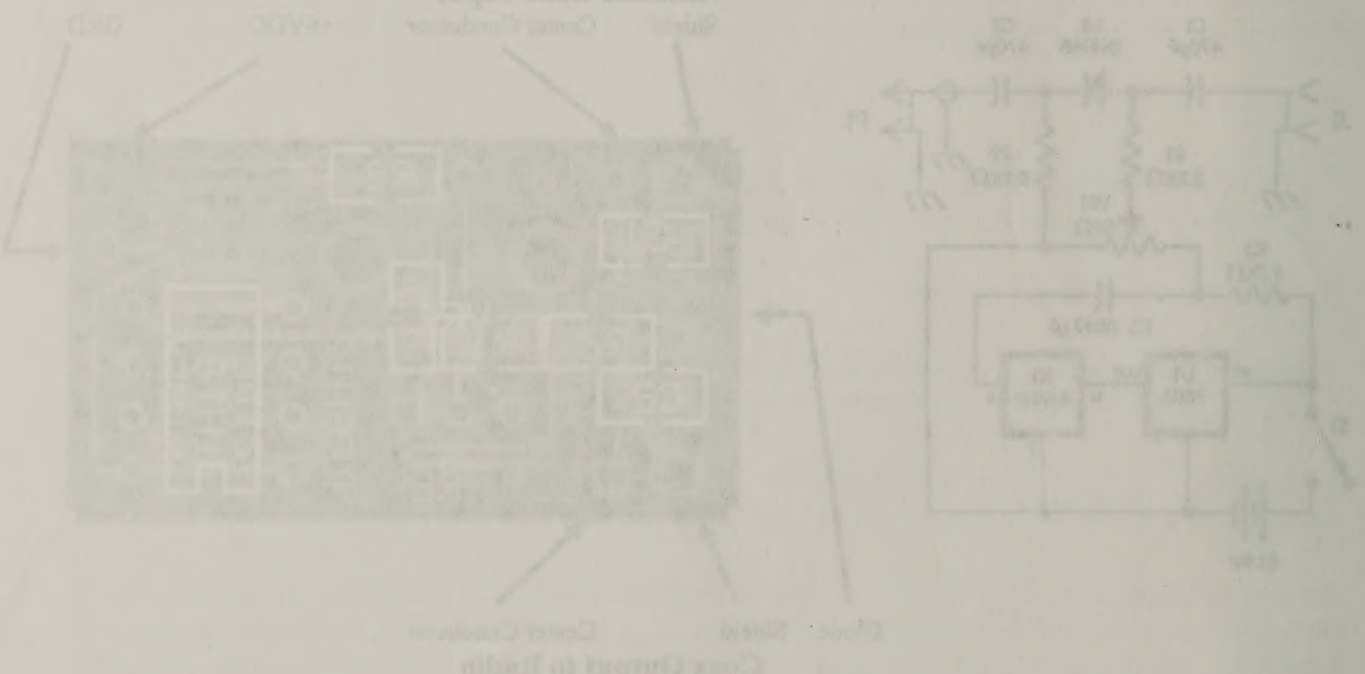
Parts List

Desig	Description	P/N	
C1,2	470 pF 0805 SMT ceramic	311-1119-1-ND (DigiKey)	
C3	.0047 µF 0805 SMT ceramic	311-1133-1-ND (DigiKey)	
		81-GRM40X472K50D (Mouser)	
R1,2	2.2K 1/4 watt, 0805 SMT	311-2.2KARCT-ND (DigiKey)	
R3	4.7K 1/4 watt, 0805 SMT	311-4.7KARCT-ND (DigiKey)	
D1	1N4148 signal diode	1N4148DICT-ND (DigiKey)	
VR1	5K audio taper potentiometer	P3H8502-ND (DigiKey)	6.0 mm Shaft
U1	7805 regulator (+5V) SMT	296-13531-1-ND	
X1	4.0 MHz oscillator, ½ size	520-TCH400 (Mouser)	4 MHz Offset
	4.0 MHz oscillator, ½ size	X960-ND (DigiKey)	4 MHz Offset
	2.0 MHz oscillator, ½ size	520-TCH200 (Mouser)	2 MHz Offset
	2.0 MHz oscillator, ½ size	XC232-ND (DigiKey)	2 MHz Offset
	Battery connector	270-325 (Radio Shack)	
	PC Board		



Warning - Do not reverse battery polarity. Doing so will most likely destroy the regulator.

Notes:

1. The pot is installed on the ***non-component*** side of the board for proper operation.
2. Square pins are the crystal oscillator pin 1, IN and OUT coax center conductor, diode bar, and +9VDC.
3. Pin 1 on the crystal oscillator has a black dot and a square corner, and is mounted on the ***non-component*** side of the board (pin 1 to the square pad.)
4. The diode is mounted vertically and can mount on either side (bar to the square pin), but the unit is thinner if mounted on the non-component side.

Parts list updated 8/23/2009